OPERATION & MAINTENANCE MANUAL

Water Quality Biofiltration Swale

Manual prepared: November 2017

DFI No. D00665

Figure 1: DFI No. D00665, looking North

1. Identification

Drainage Facility ID (DFI):	D00665
Facility Type:	Water Quality Biofiltration Swale
Construction Drawings:	(V-File Numbers) 46V-120
Location:	District: 03
	Highway No.: 150
	Mile Post: 17.41 to 17.45, SB [right]

2. Manual Purpose

The purpose of this manual is to outline inspection needs and summarize maintenance actions.

3. Facility Location

The location map below details the facility location. The highway, mile posts, side streets, access location, and stormwater flow directions are noted on the map.

Facility location type: Roadway shoulder

Flow direction: North, South

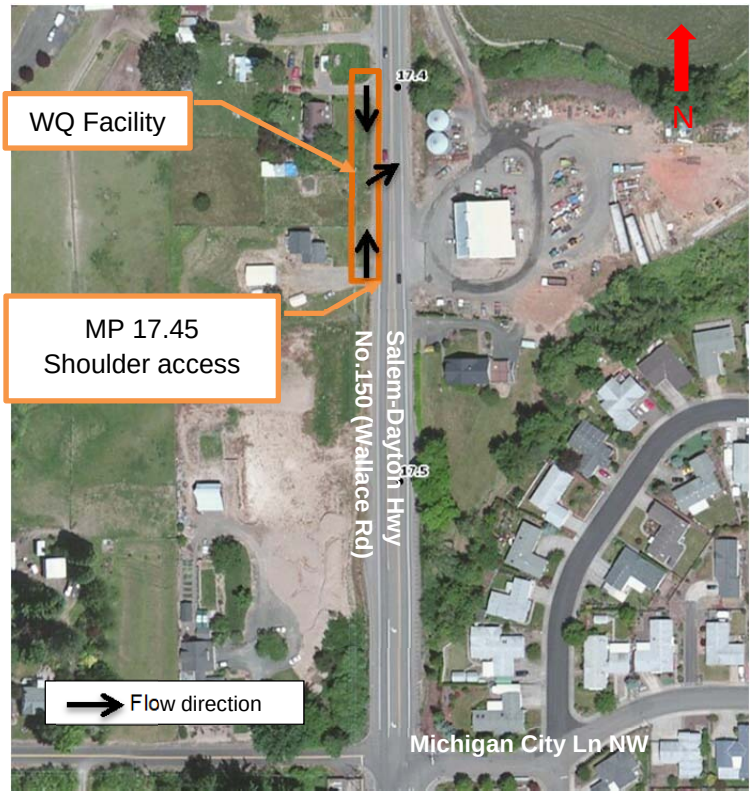


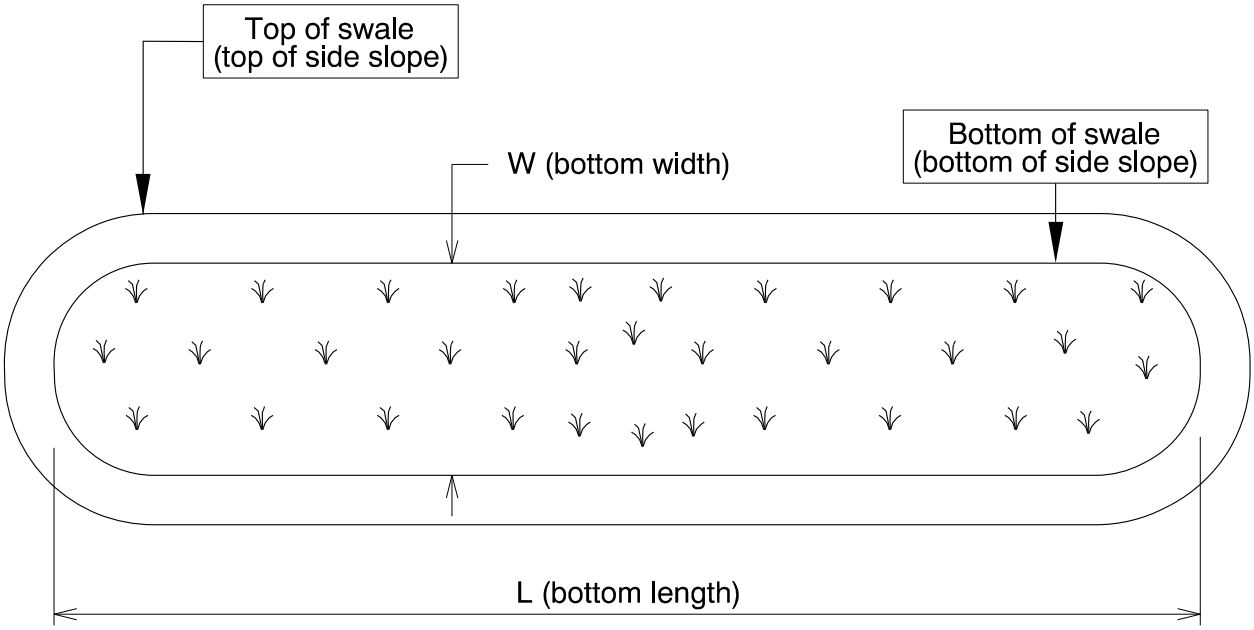
Figure 2: Facility location map

4. Facility Summary

The length and width of a swale is based on the bottom dimensions.

The bottom length and bottom width of the swale is:

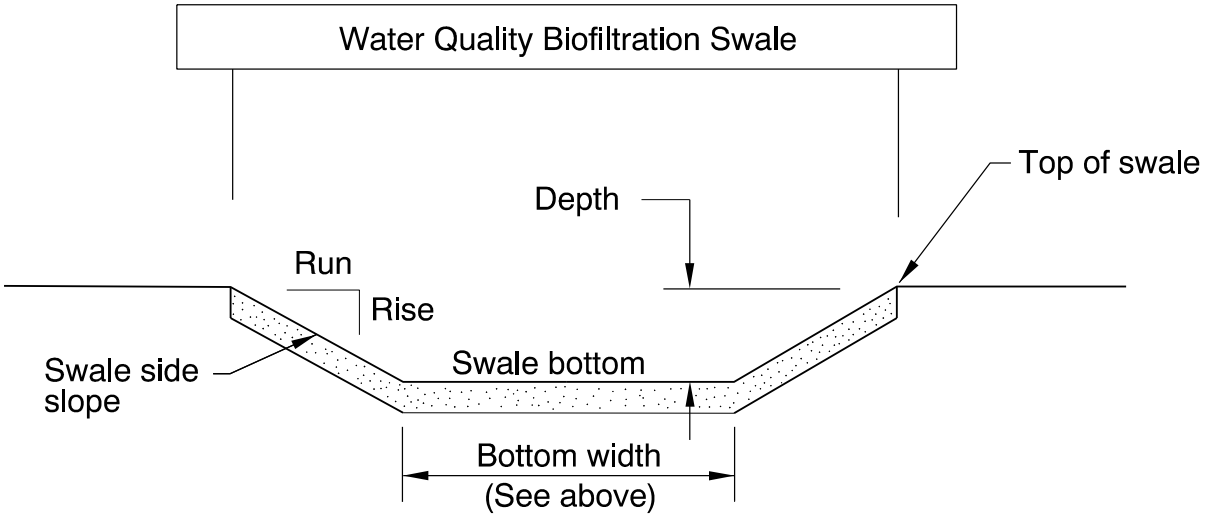
Bottom Length (feet)	Bottom Width (feet)
186	4



The depth of the swale is the vertical distance measured from the bottom of the swale to the top. The slope of the swale sides is presented by a vertical distance (rise) followed by the horizontal distance (run).

Depth and side slopes:

Depth (feet)	Rise (feet)	Run (feet)
1	1	4



Site Specific Information: Treated stormwater exits the facility via a catch basin and outfalls into a wetland on the east side of Wallace Road NW.

There is no auxiliary outlet feature constructed into this facility. In the event of flows greater than the design flow, the water will drain into roadside ditches located north and south of the swale.

V-file (46V-120)shows 3 flow spreaders, but these were not located during field visit.

5. Facility Access

Maintenance access to the facility:

☐Roadside pad	☒Roadside shoulder
☐Access road with Gate	☐Access road without Gate

Figure 3: Right highway shoulder on Wallace Rd NW heading south

6. Operational Components / Maintenance Items

Classification

This facility is classified as an:

☒ On-line Swale	☐ Off-line Swale
A swale that does not include a high flow bypass component; flow drains into and through the facility	**A swale that treats low/small flows and diverts high flows using a bypass component**

Bypass Component

This facility includes a high flow bypass component:

☒ No	☐ Yes
There is no bypass component. High flows drains into and through the facility	**There is a bypass component. Only low/small flows drain into the swale. High flows are diverted around the swale using a bypass component**

Operational Components

A swale has many components that assist with treatment, conveyance, and reducing flow velocity to minimize erosion. The components in use can vary depending if the facility was designed to operate on-line or off-line. The facility components table (**Table 1**) has been provided to highlight the applicable components for this facility. The component is in use when the box contains an "x" (e.g. ☒).

The Standard Operation Manual for Water Quality Biofiltration Swales (implemented March 2017) outlines facility operation, typical footprint configuration, and component definitions and details. A link to the manual is attached to the feature marker in TransGIS.
https://gis.odot.state.or.us/TransGIS/

Operational Plan

The applicable standard operational plan for this facility is:

☐ Operational Plan A	☒ Operational Plan B	☐ Operational Plan C
A standard operational plan illustrates the general facility footprint configuration and explains the purpose of each facility component. Operational plans (A, B, C) are provided in the Standard Operation Manual.		

See Appendix A for the site specific operational plan.

Maintenance Items

Operational components marked in **Table 1** should be inspected and maintained according to Section 7. Each facility component is defined and detailed in the Standard Operation Manual using the associated ID number indicated below.

Table 1: Swale Components		ID #
Manholes/Structures		
Pre-treatment manhole	☐	**S1**
Weir type flow splitter/flow splitter manhole	☐	**S2**
Orifice type flow splitter/flow splitter manhole	☐	**S3**
Standard manhole	☒	**S4**
Swale Inlet		
Pavement sheet flow	☒	**S5**
Inlet Pipe (s)	☒	**S6**
Open channel inlet	☐	**S7**
Riprap pad	☐	**S8**
Ground Cover		
Grass bottom	☒	**S9**
Grass side slopes	☒	**S10**
Granular drain rock	☐	**S11**
Plantings	☐	**S12**
Underground Components		
Geotextile fabric	☐	**S13**
Water quality mix	☒	**S14**
Perforated pipe	☐	**S15**
Porous pavers (access grid)	☐	**S16**
Flow Spreader		
Rock basin (used at inlet)	☒	**S17**
Anchored board (midpoint of swale or every 50 feet along swale bottom)	☐	**S18**
Other:	☐	**S19**
Swale Outlet		
Catch basin with grate	☒	**S20**
Outlet Pipe (s)	☒	**S21**
Open channel outlet	☐	**S22**
Auxiliary Outlet:	☐	**S23**
Outfall Type		
Waterbody (**C**reek/**L**ake/**O**cean) Note: Pipe outfalls to wetland area	☒ **C** ☐ **L** ☐**O**	**S24**
Ditch	☐	**S25**
Storm drain system	☐	**S26**
Outfall Components		
Riprap pad	☐	**S27**
Riprap bank protection	☐	**S28**

7. Maintenance

Maintenance Frequency/Maintain Records

a. Inspect annually. Preferably prior to the rainy season.
b. Clean and maintain as necessary. Refer to Activity 125 for conditions when maintenance is needed.
c. Keep a record of inspections, maintenance, and repairs.

Maintenance Guide/Maintenance Actions

The ODOT Routine Road Maintenance Water Quality and Habitat Guide (the *Blue Book*) outlines the standard maintenance actions for water quality facilities under Activity 125.

There are standard maintenance tables for standard ODOT designs. The maintenance tables describe the maintenance component, the defect or problem, the condition when maintenance is needed, and the recommended maintenance to correct the problem. Use the following tables to maintain ODOT swales:

- Table 1 (General Maintenance): Contains general maintenance and inspection guidelines that are applicable to all ODOT water quality facilities
- Table 3 (Maintenance of Water Quality or Biofiltration Swales): Contains maintenance information for swales

The *Blue Book* can be viewed at the following website:
http://www.oregon.gov/ODOT/Maintenance/Documents/blue_book.pdf

8. Limitations

Access grid installed:

☒ No	☐ Yes
There are no porous pavers installed in this swale	

Swales are designed to allow equipment access along the bottom. If an access grid is **NOT** installed, vehicles entering the swale can create depressions (tire ruts), damage vegetation, and damage structural components (e.g. flow spreaders). These conditions may result in poor treatment and drainage performance.

Equipment wheels should be kept on the tops and side slopes. Mower arms may be run along the swale bottom.

9. Waste Material Handling

Material removed from the facility is defined as waste by the Department of Environmental Quality (DEQ). Refer to the roadwaste section of the ODOT Maintenance Yard Environmental Management System (EMS) Policy and Procedures Manual for disposal options:

http://www.oregon.gov/ODOT/Maintenance/Documents/ems_manual.pdf

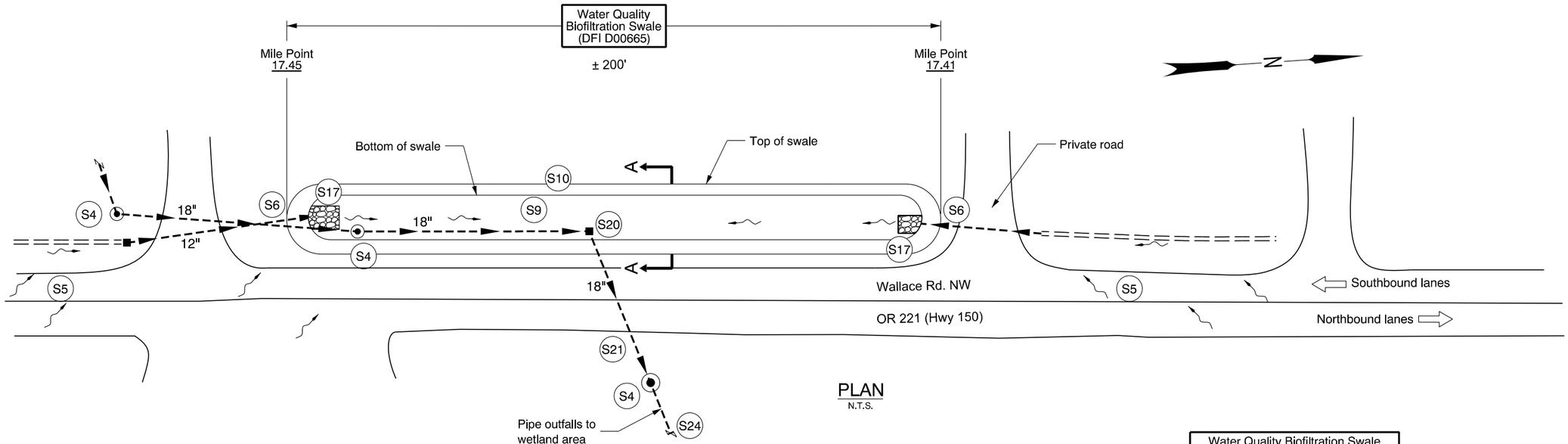
Contact any of the following for more detailed information about management of waste materials found on site:

ODOT Clean Water Unit	(503) 986-3008
ODOT Statewide Hazmat Coordinator	(503) 667-7442
ODOT Region 1 Hazmat Coordinator	(503) 731-8290
ODOT Region 2 Hazmat Coordinator	(503) 986-2647
ODOT Region 3 Hazmat Coordinator	(541) 957-3594
ODOT Region 4 Hazmat Coordinator	(541) 388-6186
ODOT Region 5 Hazmat Coordinator	(541) 963-1590
ODEQ Northwest Region Office	(503) 229-5263

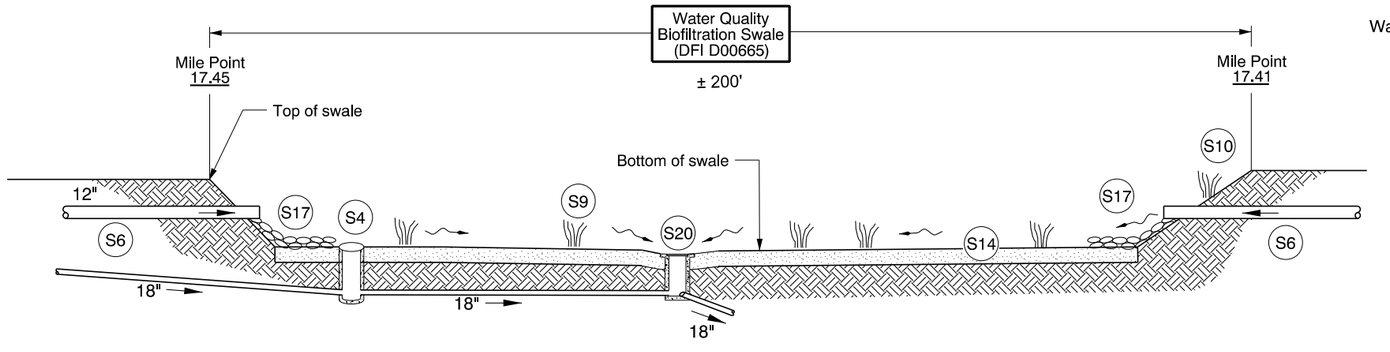
A Appendix A – Site Specific Operational Plan

Contents:

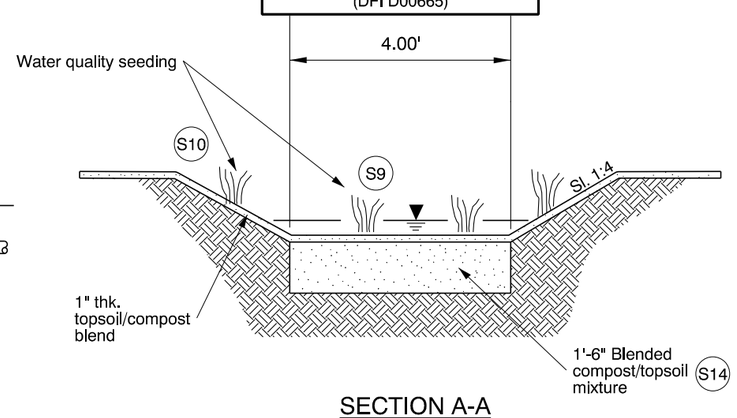
Operational Plan: DFI D00665



PLAN
N.T.S.



PROFILE
N.T.S.



SECTION A-A
N.T.S.

LEGEND:

- Manhole
- Inlet
- Storm Pipe (Facility)
- Conveyance Direction
- Pavement / Facility Flow Path
- S# Swale Component (Table 1)

OREGON DEPARTMENT OF TRANSPORTATION

Prepared By: Shreya Jain

Drafted By: Chabeli Arreola

DFI D00665
MAINTENANCE DISTRICT 03 HWY 150
WQ BIOFILTRATION SWALE
HIGHWAY MP 17.41-17.45
POLK COUNTY

DFI_D00665.dgn

B Appendix B – Project Contract Plans

Contents:

Site Specific Subset of Project Contract Plan 46V-120

46V-120

INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
1	Title Sheet
1A	Index Of Sheets Cont'd.
1A-2	Std. Drg. Nos.

STATE OF OREGON

DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED PROJECT

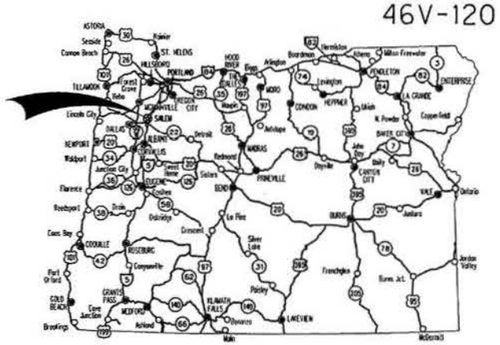
GRADING, DRAINAGE, STRUCTURE, PAVING, SIGNING, SIGNALS & ROADSIDE DEVELOPMENT

OR221: WALLACE RD. @ GLEN CREEK RD. (SALEM) SEC.

SALEM - DAYTON HIGHWAY

POLK COUNTY

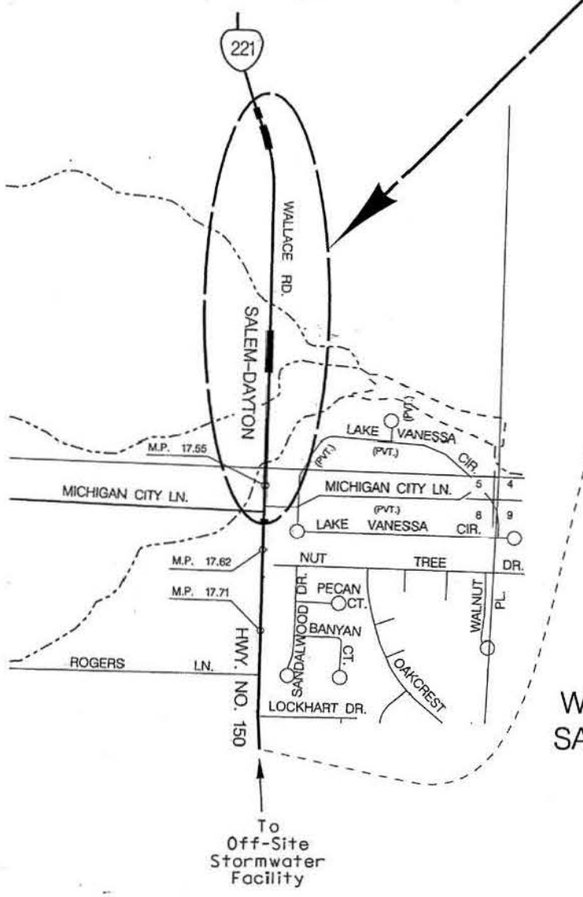
SEPTEMBER 2013



Overall Length Of Project - 0.18 Miles

STA. "W2" 189+00 (M.P. 17.20)

STA. "W2" 928+60 (M.P. 17.59)



STP-S150(010)

BEGINNING OF PROJECT

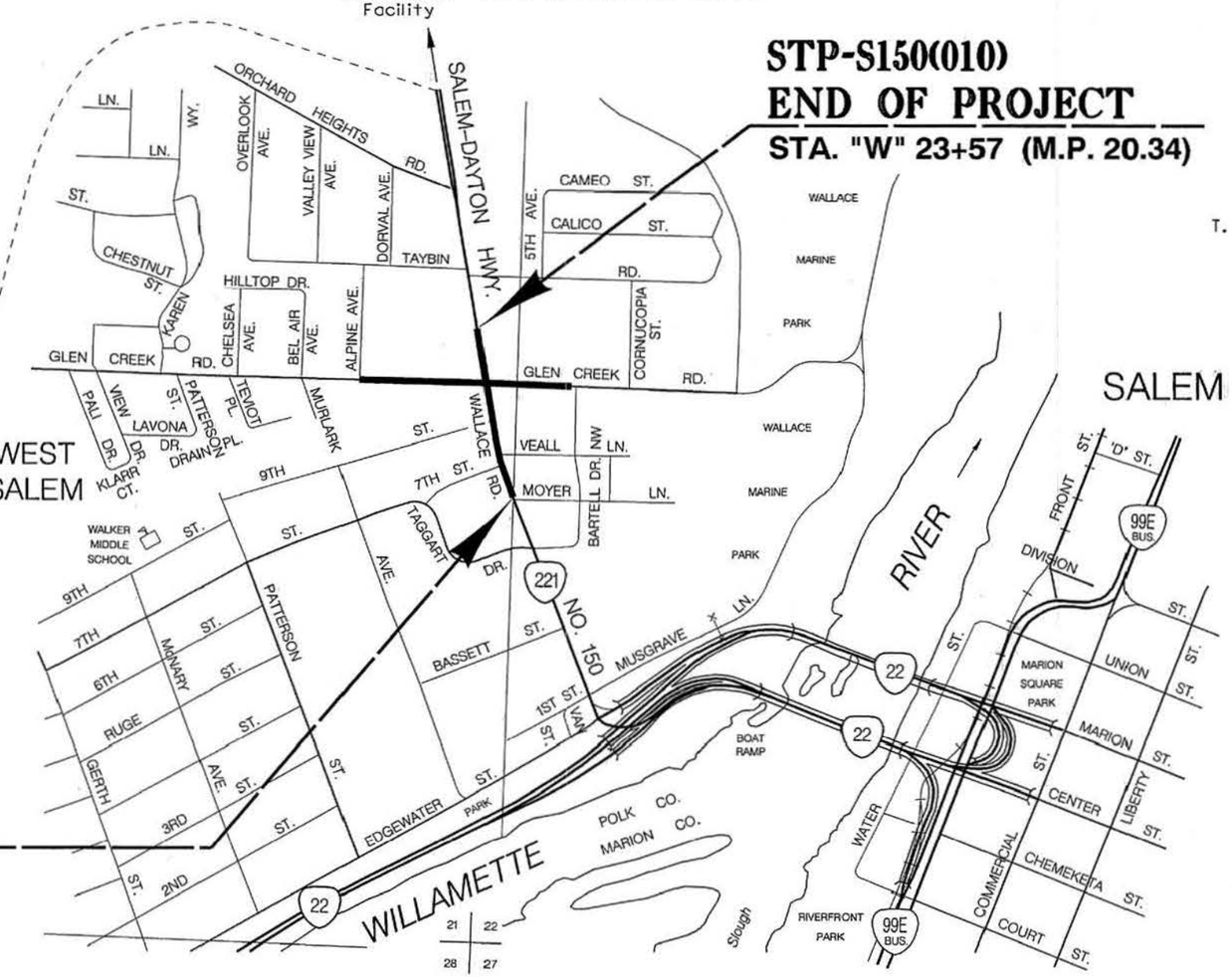
STA. "W" 14+06 (M.P. 20.52)

To Off-Site Stormwater Facility

STP-S150(010)

END OF PROJECT

STA. "W" 23+57 (M.P. 20.34)



T. 7 S., R. 3 W., W.M.

ATTENTION:
Oregon Law Requires You To Follow Rules Adopted By The Oregon Utility Notification Center. Those Rules Are Set Forth In OAR 952-001-0010 Through OAR 952-001-0090. You May Obtain Copies Of The Rules By Calling The Center. (Note: The Telephone Number For The Oregon Utility Center Is (503) 232-1987.)

LET'S ALL WORK TOGETHER TO MAKE THIS JOB SAFE

OREGON TRANSPORTATION COMMISSION

Pat Egan	CHAIR
Mary F. Olson	COMMISSIONER
David Lohman	COMMISSIONER
Mark Frohnmayer	COMMISSIONER
Tammy Baney	COMMISSIONER
Matthew L. Garrett	DIRECTOR OF TRANSPORTATION

These plans were developed using ODOT design standards. Exceptions to these standards, if any, have been submitted and approved by the ODOT Chief Engineer or their delegated authority.

By: _____ 8-12-13
Signature & date

Michael T. Long - R2 Tech Center Manager
Print name and title

_____
Concurrence by ODOT Chief Engineer

OR221: WALLACE RD. @ GLEN CREEK RD. (SALEM) SEC.
SALEM - DAYTON HIGHWAY
POLK COUNTY

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	STP-S150(010)	1

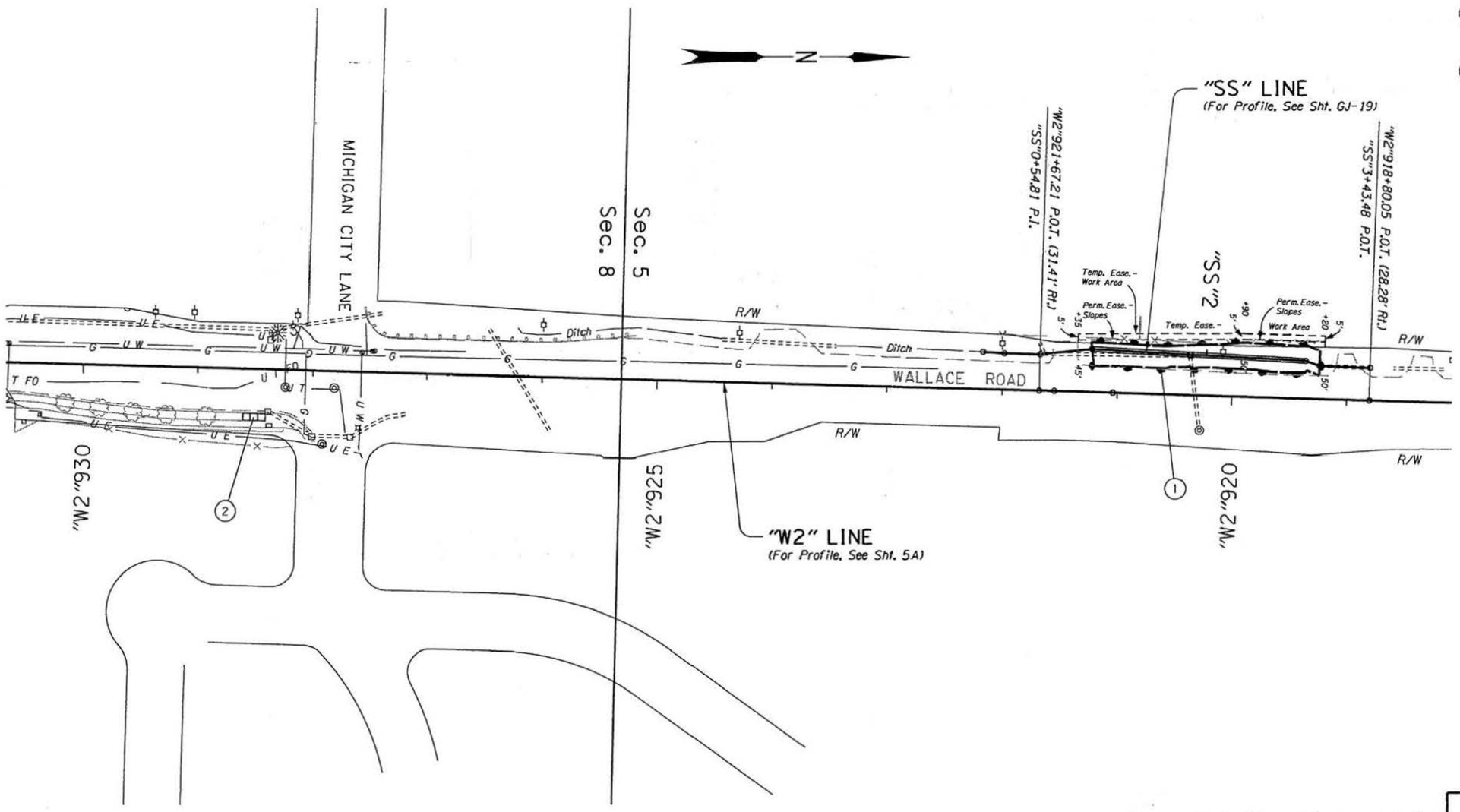
PE001439

T. 7 S., R. 3 W., W.M.
WEST SALEM

46V-120

(1) Const. south water quality swale and drainage facilities (For drg. nos., see sht. 1A)

(2) Sta. "W2" 928+40.33, 38.51' Lt.
Const. ODOT designed Water Quality Structure #16
4" Invert elev. out 204.82
(For drg. nos., see sht. 1A)



OREGON DEPARTMENT OF TRANSPORTATION

REGION 2 TECH CENTER

OR221: WALLACE RD. @
GLEN CREEK RD. (SALEM) SEC.
SALEM - DAYTON HIGHWAY
POLK COUNTY

Design Team Leader - Carol Cartwright
Designed By - Jerry Rosenblad
Drafted By - Jeff Larson

GENERAL CONSTRUCTION

SHEET NO. 5

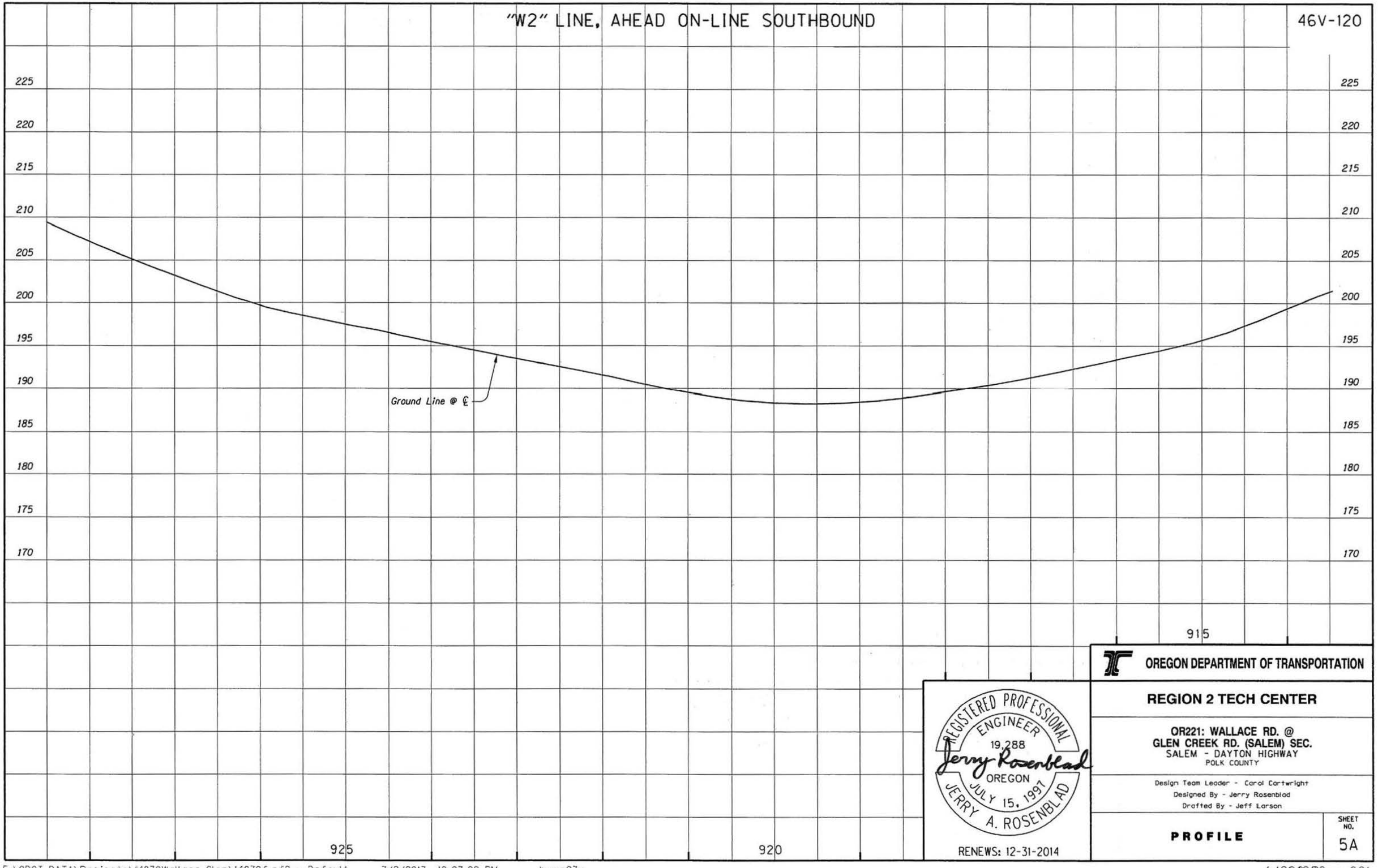
REGISTERED PROFESSIONAL ENGINEER
19288
Jerry Rosenblad
OREGON
JULY 15, 1997
JERRY A. ROSENBLAD
RENEWS: 12-31-2014

F:\ODOT_DATA\Projects\14870Wallace_Glen\14870f.pl2 :: Default 7/2/2013 12:07:06 PM hwye07x

1:1200 Plt - 001

"W2" LINE, AHEAD ON-LINE SOUTHBOUND

46V-120



OREGON DEPARTMENT OF TRANSPORTATION

REGISTERED PROFESSIONAL ENGINEER
19,288
OREGON
JULY 15, 1997
JERRY A. ROSENBLAD
RENEWS: 12-31-2014

REGION 2 TECH CENTER

OR221: WALLACE RD. @ GLEN CREEK RD. (SALEM) SEC.
SALEM - DAYTON HIGHWAY
POLK COUNTY

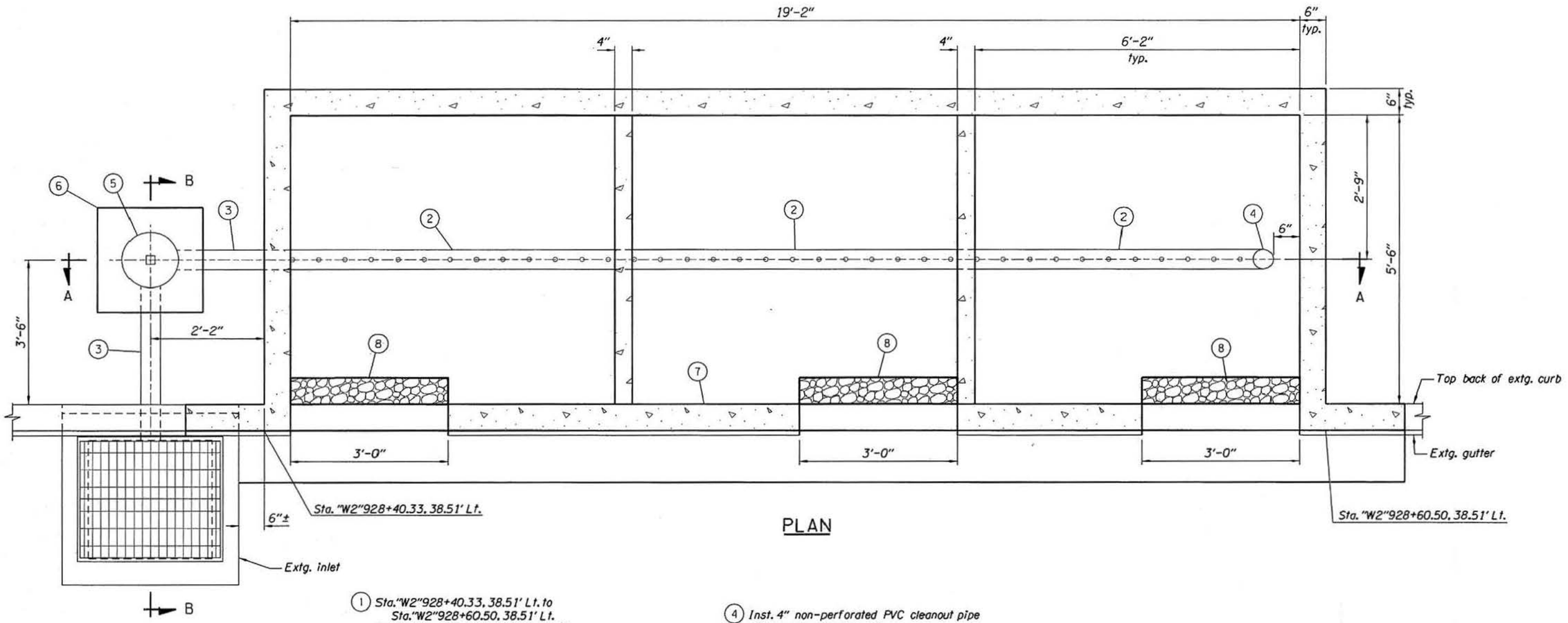
Design Team Leader - Carol Cartwright
Designed By - Jerry Rosenblad
Drafted By - Jeff Larson

PROFILE

SHEET NO. 5A

F:\ODOT_DATA\Projects\14870Wallace_Glen\14870f.pf2 :: Default 7/2/2013 12:07:09 PM hwye07x

1:1



PLAN

(1) Sta. "W2" 928+40.33, 38.51' Lt. to Sta. "W2" 928+60.50, 38.51' Lt.
Const. water quality structure no. 16
Drainage Geotextile Type 1 - 23 sq. yd.
Ecology Mix - 4.1 cu. yd.
Growth medium - 2.1 cu. yd.
Concrete - 6.7 cu. yd.
General exc. - 26 cu. yd.
Wire reinforcement - 42 sq. yd.
Granular Drain Backfill Material - 4.8 cu. yd.
(For details, see shts. GJ-16 & GJ-17)

(2) Inst. 4" perforated PVC pipe - 19'
5' depth

(3) Inst. 4" non-perforated PVC pipe - 6'
5' depth

(4) Inst. 4" non-perforated PVC cleanout pipe with screw-on cap - 4'
5' depth

(5) Inst. 12" non-perforated PVC riser with screw-on cap - 4'

(6) Inst. 2' x 2' x 4" concrete pad around 12" PVC riser

(7) Const. curb and curb openings
(For details, see shts. GJ-16 & GJ-18)

(8) Inst. drain rock drip pad under curb openings. Pads to be curb opening length by 6" wide by 4" thick - 1.5 cu. ft.

NOTES:
For Sections A-A and B-B, see sht. GJ-16.

ODOT DESIGNED WATER QUALITY STRUCTURE NO. 16

REGISTERED PROFESSIONAL ENGINEER
65305
OREGON
JANUARY 23, 2001
BRUCE A. CARMICHAEL
EXPIRES: 12/31/2013

OREGON DEPARTMENT OF TRANSPORTATION

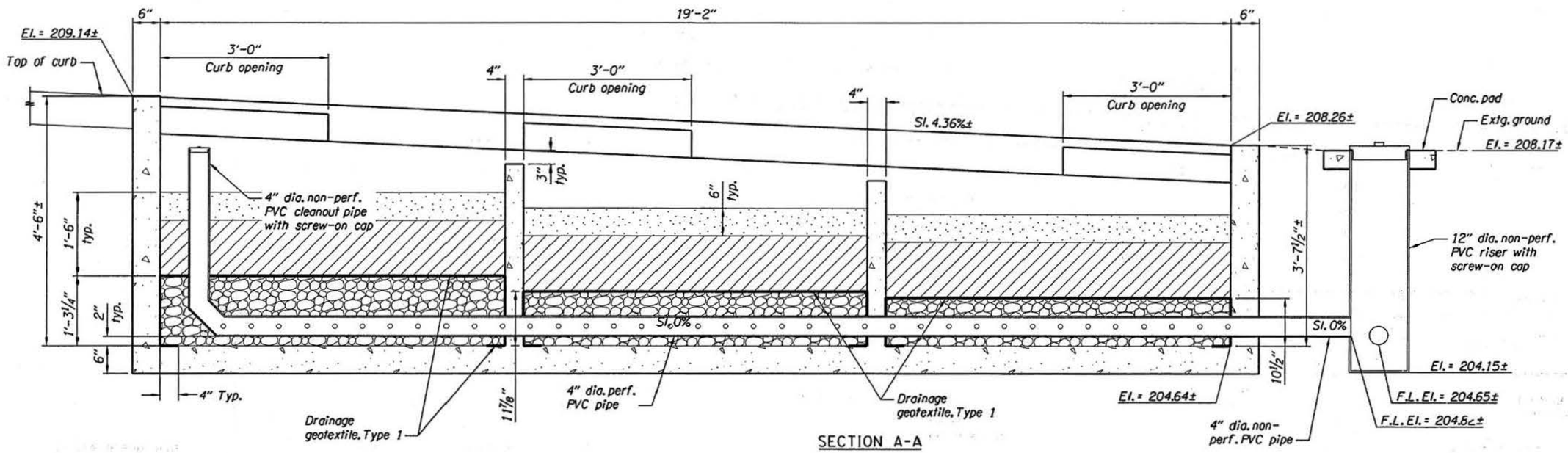
REGION 2 TECH CENTER

OR221: WALLACE RD. @ GLEN CREEK RD. (SALEM) SEC.
SALEM - DAYTON HIGHWAY
POLK COUNTY

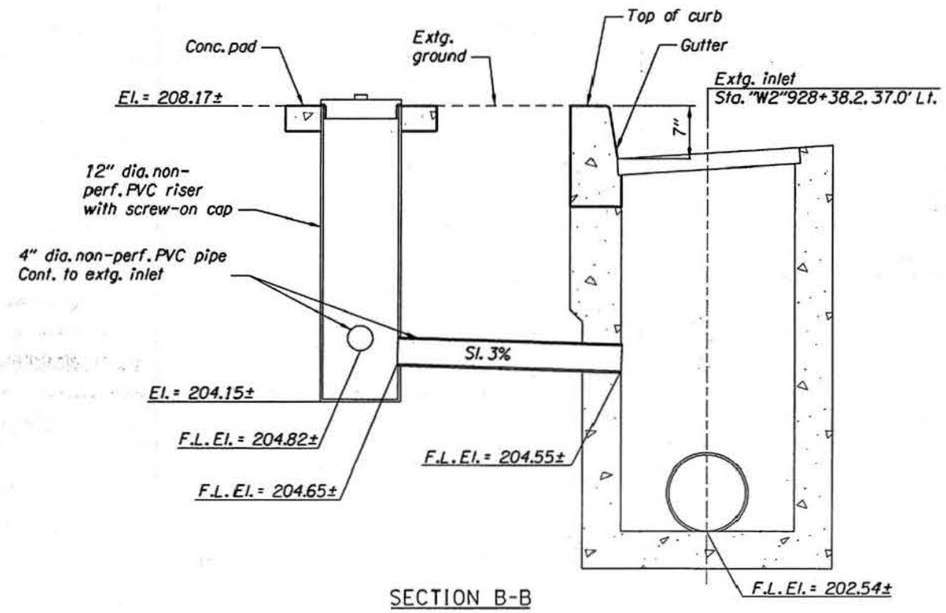
Reviewed By - Bo Miller
Designed By - Bruce Carmichael
Drafted By - Sandra Gish

STORMWATER DETAILS

SHEET NO. GJ-15



SECTION A-A



SECTION B-B

Growth Medium
Ecology mix
Granular drain backfill material

NOTE:
For Sections A-A and B-B locations, see sht. GJ-15.

ODOT DESIGNED WATER QUALITY STRUCTURE NO. 16

REGISTERED PROFESSIONAL ENGINEER
65305
OREGON
JANUARY 23, 2001
BRUCE A. CARMICHAEL
EXPIRES: 12/31/2013

OREGON DEPARTMENT OF TRANSPORTATION

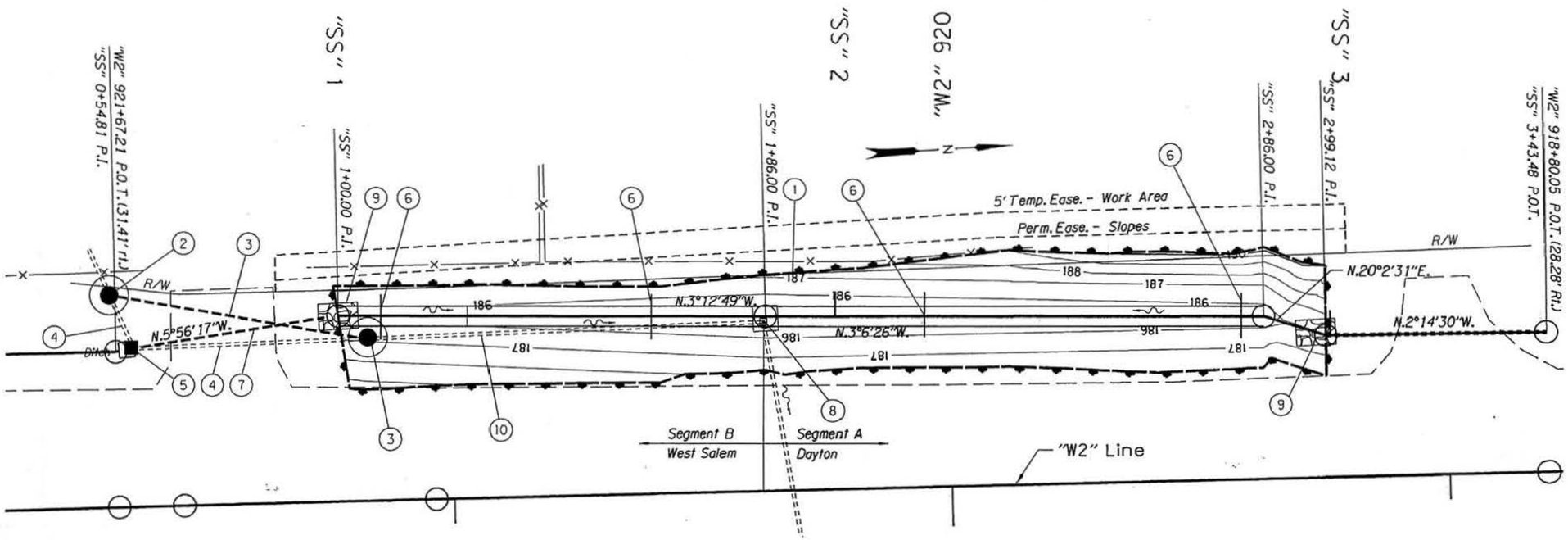
REGION 2 TECH CENTER

OR221: WALLACE RD. @ GLEN CREEK RD. (SALEM) SEC.
SALEM - DAYTON HIGHWAY
POLK COUNTY

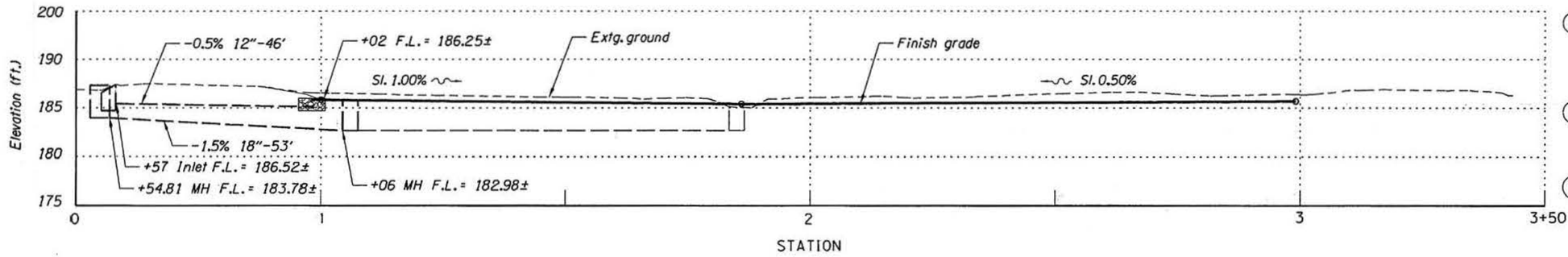
Reviewed By - Bo Miller
Designed By - Bruce Carmichael
Drafted By - Sandra Gish

STORMWATER DETAILS

SHEET NO. GJ-16



PLAN



PROFILE

(1) Sta. "SS" 1+00.00 to Sta. "SS" 3+00.00
Const. water quality swale to contours shown
Blended topsoil/compost mixture - 45 cu. yd.

(2) Sta. "SS" 0+53.56, 3.5' Lt.
Const. manhole 48" dia.
Connect to extg. 18" pipe
Rim El. @ grade, field fit

(3) Sta. "SS" 1+06.00, 3' Rt.
Const. manhole 48" dia
Connect to extg. 18" pipe
Inst. 18" pipe - 53'±
10' depth

(4) Remove portions of extg. 18" pipe - 58'±

(5) Sta. "SS" 0+57.00
Remove extg. inlet
Const. type "D" inlet
F.L. = 186.52'

(6) Inst. flow spreaders - 20'

(7) Inst. 12" dia. (conc. Class v) pipe - 46'
5' depth
Inlet I.E. = 186.52
Outlet I.E. = 186.25

(8) Sta. "SS" 1+85.00
Adjust extg. inlet
Top of grate El. @ F.L.
of swale - field fit

(9) Sta. "SS" 1+02.00 And Sta. "SS" 2+97.00
Inst. 4'x4'x1' riprap (class 50) pad - 1.2 cu. yd.

(10) Preserve and protect extg. pipe

REGISTERED PROFESSIONAL ENGINEER
65305
OREGON
JANUARY 23, 2001
BRUCE A. CARMICHAEL
EXPIRES: 12/31/2013

OREGON DEPARTMENT OF TRANSPORTATION

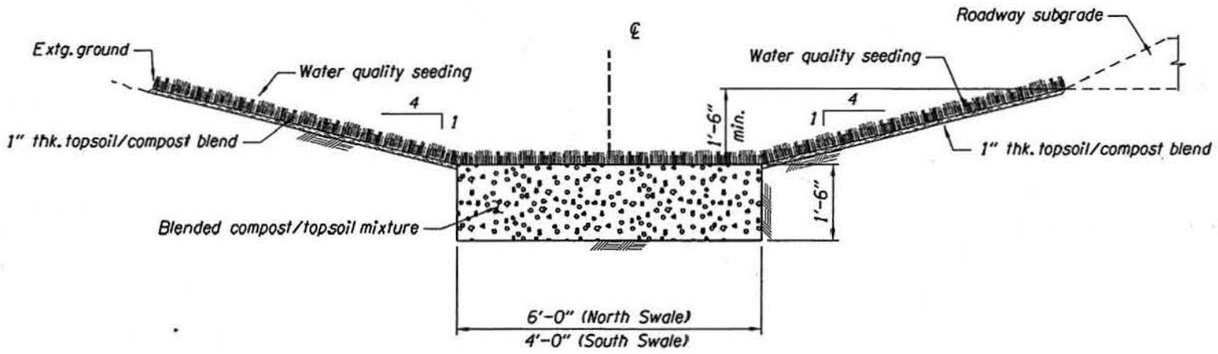
REGION 2 TECH CENTER

OR221: WALLACE RD. @ GLEN CREEK RD. (SALEM) SEC.
SALEM - DAYTON HIGHWAY
POLK COUNTY

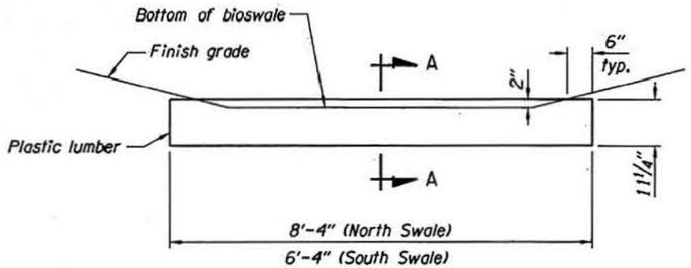
Reviewed By - Bo Miller
Designed By - Bruce Carmichael
Drafted By - Sandra Gish

STORMWATER PLAN
SOUTH WATER QUALITY SWALE

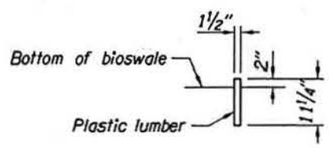
SHEET NO. GJ-19



TYPICAL SECTION



ELEVATION



SECTION A-A

FLOW SPREADER DETAILS

REGISTERED PROFESSIONAL ENGINEER
65305
OREGON
JANUARY 23, 2001
BRUCE A. CARMICHAEL
EXPIRES: 12/31/2013

OREGON DEPARTMENT OF TRANSPORTATION

REGION 2 TECH CENTER

OR221: WALLACE RD. @
GLEN CREEK RD. (SALEM) SEC.
SALEM - DAYTON HIGHWAY
POLK COUNTY

Reviewed By - Bo Miller
Designed By - Bruce Carmichael
Drafted By - Sandra Gish

STORMWATER DETAILS

SHEET NO. GJ-21